

REMARKS

Preliminarily, the Examiner is kindly requested to note that the undersigned practitioner has recently joined the firm of Carpenter and Kulas, LLP. The mailing address and telephone numbers of the undersigned attorney remains unchanged.

With this Amendment, Applicants address the rejections of the outstanding Office Action mailed May 28, 2003. Favorable reconsideration of this patent application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 7, 13, 14, 15, 16, 31, 32 and 33 stand rejected under 35 U.S.C. §102(e) as being anticipated by Borta, U.S. Patent No. 6,445,960. Independent claims 1 and 31 have been amended and are now believed to be in allowable condition.

Claims 2-6, 17-30, and 39-45 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Borta in view of Barr, U.S. Patent No. 5,711,670 because Barr shows a display device positioned proximate to the motion plate and means for generating and synchronizing audio/visual signals. Independent claims 17, 22 and 27 have been amended and are now believed to be in allowable condition.

With this amendment, independent claims 1, 17, 22, 27 and 31 have been amended to more specifically claim the present invention. Specifically, claims 1 and 31 recite the novel dynamic boost that is used to selectively maintain or increase torque of the AC, or induction, motors. Claims 17, 22 and 27 each include this limitation and further include a power sink that dissipates regenerative energy during directional transitions.

The present invention, as claimed, is directed to a low cost personal simulator. Central to the design is a controller that enables low cost AC motors to be operated at a range of speeds that includes, a low speed or zero speed. To maintain torque at low or zero speeds, a dynamic boost is applied to the individual windings of the motors. None of the references suggest this novel low cost solution to providing a personal simulator that actually works.

In contrast to Borta, the present invention does not attempt to control applied voltage to the motors by switching relays because it is believed that the embodiment disclosed by Borta is not reliable and is not able to maintain the motion plate and passenger in a static position. One skilled in the art will appreciate that with zero power applied to a winding of an AC or induction motor, the motor torque is necessarily zero. Thus, Borta must rely on the gearbox to hold the motion plate in a quasi-static position when the relays are open and no voltage is applied to the motor. While Borta teaches that the platform can be moved at a slow speed by supplying the motors with an interrupted or pulsed voltage (see column 7 at line 58) his design does not permit the motion platform to held static over a period of time.

Borta further illustrates in Figure 5 that the power is applied to the motors through solid state relays. It will be appreciated that such an arrangement is not operational for AC motors because when the motor is turning slowly or stopped, and the relays are turned from an 'off' state to an 'on' state, a large instantaneous current will be drawn by the motor. Such a current surge will reduce the life of the relay and quickly damage the motor and the power supply.

The Examiner also contends that Borta discloses a means for generating a frequency-modulated signal for driving the induction motors of the present invention and maintaining torque within the selected range. Applicants respectfully traverse this contention. As noted above, Borta cannot control the motors at zero speed and, in fact, he can only change the speed of the motion

platform from fast to slower or change the direction. Borta does not even control all three windings of the AC motor because he only uses two relays for each motor. Thus, there is no suggestion that his switching relay arrangement is sufficient to generate a three phase pulse width modulated drive voltage as specifically set forth in claim 31. Moreover, Borta does not suggest the use of a dynamic boost to control the motion platform at zero or low speed as set forth in claims 1, 17, 22 and 27.

Barr discloses a hydraulic pumping and control valve system that is controlled by a ride controller as noted at column 8. However, there is no suggestion that rider controller generates a frequency modulated signal for driving the hydraulic actuators. Indeed, Barr specifically teaches that the ride controller produces a "level" of hydraulic pressure to the actuators. Barr neither teaches nor suggests the use of a frequency-modulated signal to control low cost induction motors in a manner claimed by the present invention. Even if, *arguendo*, the Barr hydraulic ride controller could be adapted to drive an induction motor, there is no suggestion to provide a signal boost during low speed or static operation of the motion platform as now claimed by the presently amended claims because Barr relies on the cushion of hydraulic fluid and hard mechanical stops.

Further, neither Borta nor Barr suggest the use of a sink to discharge regenerative energy produced upon a sudden change in motion of the motion platform. For this reason alone, claims 17, 22, 27 and 31 are believed to be patentably distinguished from these references.

It is also noted that Barr is related to an expensive multi-passenger hydraulic controlled motion system and is not comparable to a low cost one person simulator system that may be used in the home or arcade environment. Accordingly, it is non-analogous art with respect to the control of low cost AC

motors used to changing the spatial orientation of motion platform in a personal simulator system in conjunction with an audio/visual display.

There is no suggestion, in any of the cited references, to suggest the novel combination of the present invention, as presently claimed. None of the prior art of record suggests or teaches a low cost personal simulator that uses dynamic boost to maintain the position of the motion plate at zero or low speed or to dissipate regenerative power during deceleration. There is no suggestion or teaching in the cited art, either alone or in combination, that would lead one skilled in the art to control AC or induction motors in the manner described and claimed by the present application to position a motion plate in a low cost personal simulator.

With respect to claims 1, 17, 22, 27 and 31, as presently amended, it is submitted that the prior art, either alone or in combination, does not teach, disclose or suggest a personal simulator that uses low cost AC, or induction motors, and a controller that controls the motors in such a manner that the motion platform can support a load across a range of speed, including zero speed. Accordingly, claims 1, 17, 22, 27 and 31, as amended, are now believed to be in allowable condition.

Claims 2-6, 15, 18-19, 23, 28-29 and 32 have further been amended to present the claims in better form more specifically claim the present invention and to correct informalities identified by Applicants in the claims. Claims 8-12, 16, 24, 25, 33-45 depend from allowable base claims and are thus also believed to be allowable.

Applicants submit that amended independent claims 1, 17, 22, 27 and 31 distinctly claim and particularly point out the invention. All remaining claims depend on one of the independent claims and further clarify important aspects of

the claimed invention. Thus, Applicants respectfully submits that all pending claims are patentably distinct from the prior art.

Accordingly, it is respectfully submitted that claims 1-6, 8-12, 15-19, 22-25, 27-29 and 31-45 are now allowable because the claims particularly point out and distinctly claim the subject matter that Applicants regard as their invention. Reconsideration of the objections and rejections is respectfully requested. Allowance of claims 1-6, 8-12, 15-19, 22-25, 27-29 and 31-45, as now amended, at an early date is earnestly solicited.

Applicants hereby petition for a two-month extension of time to reply to the Office Action under 37 CFR 1.136(a). If however, an additional extension of time is required, Applicants hereby provisionally request such additional extension. Any additional charges for this extension of time or for the additional independent claim may be charged to Deposit Account No. 19-2050.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Craig E. Shinnars", written over a horizontal line.

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